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THE
PETROLEUM INDUSTRY
OF BAKU
AND
NOBEL BROTHERS
PETROLEUM PRODUCTION COMPANY.

June, 1893.



ST. PETERSBURG.

TRENKE & FUSNOT, Printers, Maksimilianovsky Per., 13.

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Дозволено цензурою. С.-Петербургъ, 22 іюня 1893 г.

The Petroleum Industry of Baku and Nobel Brothers Petroleum Production Company.

The Caucasian mountain range terminates on the South Eastern side at the shore of the Caspian sea by the peninsula of Apsheron which, since ancient time, was famous for its naphtha springs and, particularly, for the wells of inflammable gas exhaled from the ground. All know the phantastic part which this locality played in the religion of the fire-worshippers, the priests of which, during many centuries, guarded the „eternal fire“ sustained by the evaporation of the subterranean oils.

On the south side of this peninsula is a bay affording excellent anchorage for vessels, and here is situated the town of *Baku*, which not long ago was an insignificant provincial townlet, but now, thanks to the developement of the naphtha industry, has become a populous, well organised and flourishing town.

Although, as above mentioned, the existence of naphtha in the vicinity of Baku was known from time immemorable,

the industrial exploitation of the oil only commenced since 1832. Seeing, however, that even at that time the naphtha was obtained from pits, wells and natural springs, it stands to reason that at that period it was impossible to think of a more considerable production, and the yearly output too was represented only by several hundred thousands of poods. Many years even elapsed after the invention of the Petroleum lamp in America and the marvelous developement in that country of the mineral oil industry, before we in this country thought of a proper exploitation of the wealth of naphtha in Baku. An improvement occurred only when in 1871 the first boring was made, and when a year later the leasing system hitherto in vogue was abolished. The first boring was soon followed by many others and, thanks to free competition, a chance was afforded for capital and enterprise to impart new life to this branch of industry.

Meantime *American enterprise* had succeeded in gaining possession of the markets of the old and new worlds, including Russia, whereas Russian petroleum was only consumed in the parts adjoining the Caspian sea and the Volga. It even happened that American petroleum, thanks to its good quality and cheapness, competed with the local article not only in other parts of Russia but also on the Volga.

We may now ask, in what state at that time was the *Russian naphtha industry*, and to what was attributable the fact that the sale of the products obtained was so limited?

In accordance with the traditions of Russian trade, mineral oil like all other merchandise was sent annually to the fair at Nijni-Novgorod, where it was disposed of at a more or less moderate price according to the demand.

The inferior quality of this oil, due to the primitive mode of distillation, and the bad quality of wooden barrels in which the oil was transported and stored, rendered it impossible to

compete in those markets where the American petroleum had obtained an entry. Owing to the absence of timber in the vicinity of Baku the wood necessary for the manufacture of barrels had to be brought from afar, and consequently was expensive.

The conveying of the crude oil from the pits and borings to the refineries had to be effected in skins and barrels on carts; and as the roads between the wells and the distilleries were in such a deplorable condition that only a few poods of oil could be conveyed in one cart, crude oil arrived at the works burdened with so many charges that it was impossible to obtain the product at a reasonable price. The refined oil had again to be poured into barrels, whilst the loading and transport in sailing vessels to Astrakhan and from thence in large barges to Nijni-Novgorod was attended with an other series of expensive and dilatory manipulations that it was lastly quite impossible to dispose of the oil on anything like a large scale.

Meantime, the enormous wealth of the oil sources continued to disclose itself more and more. Boring made at a depth of from 200-400 feet brought up oil to the surface in such quantities that it surpassed everything that had hitherto been seen in America in this respect, and the abundance of the crude oil was the cause of the fall in price of it to a ruinous figure. When afterwards new mighty fountains were opened which in the course of several months furnished from 30,000 to 50,000 barrels per diem, the position became so hopeless that on the one side they did not know how to collect and store such an enormous mass of crude oil, and on the other hand they could not find a market or, if they did, it was at such low prices that wholesale ruin of all engaged in the Baku naphtha industry appeared inevitable.

It was necessary to find an issue out of this calamitous

position and this was attained in a brilliant manner thanks to the interference in the Russian naphtha industry of a man possessed of rare intelligence and vital energy, by the appearance on the scene of the late *Ludwig Nobel*, who introduced such innovations in this industry that in a remarkably short space of time it was able not only to defeat foreign competition in Russia, but even to successfully compete with foreign producers in the markets of Western Europe.

It was in the commencement of the seventies when M^r Robert Nobel, brother to Ludwig, undertook a journey, at the instance of the latter, through the Caucasus in order to organize the exploitation for military purposes of the local walnut-wood plantations, and it was then he had the opportunity of becoming nearer acquainted with the naphtha industry. He perceived that there existed a wide field here for enterprise and intelligence, and he persuaded his brother Ludwig to aid him in establishing in Baku a small Petroleum Refinery. In 1876, Ludwig Nobel also visited the place, studied the geological and economic conditions of the peninsula of Apsheron and came to the conclusion that the naphtha industry was capable of enormous developement, and of attaining vast proportions if the exploitation were organized in accordance with the latest technical improvements and requirements.

In 1876, the brothers started their enterprise and in 1879 it was converted into a stock company. The object they had in view was to remove as far as possible the existing defects in the exploitation, and to reduce the cost of transport to such a degree that Russian Petroleum could, at least, command all the native markets in the Empire.

The first point was to connect the naphtha pits situated near Balakhany, at a distance of about 15 kilometres from Baku, by means of *pipes* with the shore where their refineries

were erected. From these works, where every care was taken to introduce into use the most perfected working system, the refined petroleum was to be sent out not as was formerly the case in barrels, but in specially constructed *cistern-steamers*, which were filled with the oil by means of pumps through a pipe line laid down on the shore from the works to the landing stage.

In addition to the large cistern steamers which were to serve in transporting the oil across the Caspian, and which owing to their large draught were not suitable for more shallow routes, it was necessary to have corresponding steamers and lighters for the latter service to receive the oil at Astrakhan and convey it up the Volga to Tsarytzin. From this point commenced the ramification of Russian railways, and here was established a large store from whence the petroleum was to be distributed throughout the whole of Russia. The use of barrels was likewise to be discontinued on the railways; the oil was to be conveyed to the various points of destination by means of *tank-cars*.

The erection of *stores* and *reservoirs* at the principal railway stations perfected this organization, thanks to which the mineral oil from the place of its extraction commenced to penetrate to Petersburg and to Warsaw, and to the frontiers of Austro-Hungary and Germany without having been in a barrel, and without any other mode of loading than by means of a steam pump.

The most important and striking innovation in the new organization was the transport of the oil in tank-steamers, without which of course the cistern-cars would have had no sense. It was this mode of transport by sea and land, without the employment of barrels that, thanks to Ludwig Nobel, gave the Russian petroleum trade a special character and, owing to such means of transport and the perfected appliance adop-

ted for loading and unloading petroleum, the Caucasian mineral oil has not only penetrated to the frontiers of the Russian Empire, but into all the states of Western Europe and into Africa and Asia, where it has entered into competition with American petroleum. And, indeed, the cost of illumination in Russia is at present very cheap, whereas it was most expensive before the radical reforms introduced in the Russian naphtha industry. Thus, a pood of crude naphtha cost at Baku in 1873 about 45 cops. and a pood of petroleum in Nijni-Novgorod was sold at Rbs. 6; at the present time the first costs from 1—2 cops. and the latter 35 cops. (exclusive of the excise duty of 60 cops. on light refined oils). The Govt. has a direct revenue from the excise under this head of about 16 million roubles, besides the increase in commercial transactions consequent on the annual export of naphtha products approximately for the amount of Rbs. 30,000,000. There must also be taken into account the freights taken by steamship and railway companies and the wages received by thousands of working people thanks to the naphtha industry.

The realization of the programme laid down by Messrs. Nobel created an enterprise of unexpected dimensions. At the outset the necessary funds were wanted for working this grand project, and in order to overcome this difficulty Ludwig Nobel, as far back as 1876, applied to the chief naphtha men in Baku with the proposition that they should join together in constructing pipe lines for connecting the naphtha sources with the refineries. He further proposed to the steamship company «Kavkaz & Mercuri» on the Caspian & Volga, and to the Griase Tsarytsin Railway (both companies being subsidized by the Govt.) that they should construct, conjointly with him or on their own account, several cistern-vessels and tank-cars for the transport of naphtha products. Both one

and the other Company found the project of the intrepid innovator chimerical and unrealisable, & Ludwig Nobel was ridiculed and his plan rejected. Thereupon the Nobel Bros. instead of restricting themselves to industrial activity were compelled to take into their own hands the task of distributing and disposing naphtha products throughout the Russian Empire, and it was thus that their enterprise embraced an enormous district.

But how soon the picture changed! When it transpired that the pipe line was working admirably and fabulously cheap, and that cistern-steamers, tank-cars and reservoirs suited their purposes excellently, — the most bigoted individual comprehended the immense significance of the innovation and, in a short time, the vicinity of Balakhany-Sabuntchi was bisected with pipe lines, and no one ever dreamt of conveying the crude product from the source to the works in barrels. Tank steamers on the Caspian Sea and on the Volga appeared one after the other, and the Railway Companies adjacent to the Volga were compelled in their own interests to adopt the innovation conceived by Ludwig Nobel and to supplement their rolling stock with cistern-cars. At the present time there are on the Caspian Sea and on the Volga several hundred tank-steamers and lighters; in the Black Sea 30 tank-steamers specially built for the transport of petroleum have been constructed, and along the various Russian railroads there travel over 15,000 cistern-cars engaged in transporting mineral oil.

Thanks to the perfection of this organization the growth of the Russian naphtha industry was very rapid, as is evidence by the tables in the appendix, showing *the general developement in Baku of this industry, and the participation therein in detail of the firm of Nobel Bros.*

In consequence of the abundance and cheapness of the

crude oil the Nobels found it possible to regard the question of acquisition of naphtha land as being of secondary importance, and directed special attention to the technical working of the oil.

The Company, notwithstanding that its output of petroleum represents more than 22 % of the whole industry in Baku, possesses approximately only 15 % of all the borings, and it purchases from other producers the crude naphtha approximately about one third of the quantity necessary for the fabrication of oil.

The 70 productive borings at present belonging to the Company are situated partly in Balakhany and partly in Sabuntchi, consequently they are separated from the town of Baku and from the works by a distance of about 15 kilos.

The works of the Company situated near Baku in the so called „Black Town“ are connected with the naphtha sources by 2 pipe lines, through which there passed in 1892 over 51,000,000 poods of crude oil. There are besides two special pipe lines from the Works to Balakhany for the water supply, and a canal to the works from the sea for the same purpose.

The Works are divided into six sections: *distillery*, *refinery* for *illuminating oil*, *refinery* for *benzine*, *lubricating oil* works, *sulphuric acid* and *soda* sections.

In the *distillery* the oils are separated according to their various specific gravity. The parts out of which are prepared benzine and good illuminating oil are sent to the Refineries from whence they issue ready for use.

The *illuminating oil* thus obtained represents not more than 35 % of the natural crude product. *Benzine* on account of the small demand is turned out in inconsiderable quantities (about 60,000 poods per annum). Thus, there remains a considerable quantity of „ostatki“ (residues) which find a variety of uses.

The greater portion of these „*ostatki*“ is used as fuel in Baku, on the Caspian Sea, on the Volga and in the adjoining parts. A less considerable quantity is used up in the section for producing lubricating oils, and undergoes a distillation, until there remain only the heavy component parts which are added to ordinary *ostatki* and used for heating the works.

The *distilling boilers* (stills) for extracting illuminating oils are constructed so as to turn out in the course of 24 hours 66,000 poods or 1,100 tons of illuminating oil. At the outset, when the Company's activity was limited to supplying with oil the Russian markets and the frontier localities of Germany and Austro-Hungary, the Works were only in action during the 8 navigation months on the Volga; during this period the maximum turn out of petroleum amounted annually to poods 12,000,000 or tons 200,000. But on the opening of the *Transcaucasian Railway*, and when that line had been furnished with sufficient rolling stock, the Company sent its products abroad also *via Batoum*, and the Works were kept in action uninterruptedly all the year round, so that at present more than 18,000,000 poods of illuminating oil alone are turned out. Theoretically speaking the naphtha Works is capable of turning out 24,000,000 poods of petroleum annually.

The *lubricating oil* works is capable of producing annually not less than tons 33,000.

The *sulphuric acid* section has for its object the preparation of the requisite quantity of acid for treating illuminating and lubricating oils, although latterly sulphuric acid prepared at the Company's works has been supplied to other oil manufacturers. Up to the present time raw sulphur imported from abroad has been used in the Works and only latterly the Company has seriously thought of substituting for the raw sulphur the Caucasian copper pyrites.

The *soda* works serves the purpose of reestablishing the soda residues remaining after the refining of the petroleum in order that they may be utilised a second time.

The *mechanical* work shops, the *gas* works, the plant for *electric lighting* and the *water supply* apparatus complete the industrial organization of the enterprise, in establishing which everything was done to ensure the best results in the working and the highest quality of products.

It may be here observed that the Company is engaged at the present time apart from the production of ordinary kerosine, in preparing for the Russian markets a new illuminating oil, so called „solar oil“ or „*pyronaphtha*“ which is obtained from the heavy residue remaining after the distillation of naphtha, and has a specific gravity of 0.860 with a flashing point of 100° C.

The *transport of oil* is conducted in two directions: via the *Caspian Sea* and the *Volga*, and along the *Transcaucasian railway via Batoum* to South Western Russia and abroad. In the first named direction the article is conveyed in large Tank-steamers with a capacity of from 750 to 900 tons, which to the number of 12 transport the petroleum from the Company's wharves in Baku to the „9 feet“ roadstead off the town of *Astrakhan*, which place is separated from the Caspian Sea by shallows formed during many centuries by the current of the river *Volga*. At the „9 feet“ roadstead, a distance of 150 kilometres from *Astrakhan*, the oil is transferred from the Tank-steamers partly into river steamers (8 in number) and partly into lighters (of which there are 89). These craft carry the oil up the *Volga* to *Tsaritzyn*, *Saratoff* and *Nijni-Novgorod* i. e. to the commencement of the railway communication. The petroleum destined for *Siberia* is transported along the river *Kama*, an affluent of the *Volga*, to *Perm* and from thence it is sent to the

Company's stores in Omsk and Tomsk and to other central markets. The transport of mineral products from *Petersburg & Libau* to Scandinavia and North Eastern Germany is effected by means of a Tank-steamer, specially constructed for the Baltic sea named the „Ludwig Nobel“.

For the export of its products to the Western European States the Company mainly avails itself of the *Transcaucasian Railway*; and before the construction of the Suram tunnel, in order to facilitate and expedite the transport of its products from Baku to Batoum, it laid down between the stations of Michailoff and Quirilli, a distance of 212,000 feet, a 4 inch pipe connection. For the reception of the oil at Batoum the Company constructed reservoirs with a capacity of 1,300,000 poods, in addition to other appliances for facilitating transport. From Batoum the products are transported to Western Europe and partly to South Russia, principally in Tank-steamers, some of which are owned by the foreign agents of the Company or chartered by them.

In order to ensure the regular movement along the railways of their own *cistern-cars* the Company organized a special railway staff, and put up its own workshops for making the necessary repairs.

For the *Tank transport* service in the Caspian Sea and on the Volga the Company constructed two docks in Astrakhan, and workshops for the repairs of steamers in Tsarytsin, Astrakhan and Baku.

The construction of *Tank-steamers* represents in itself from a technical point of view special interest, seeing that the problem of transporting liquid cargo in Tanks united in one whole was solved here in a most successful manner. The advantage of this system of transport, particularly for short distances, is unquestionable. Both the loading and unloading in this case are effected in the simplest manner by means

of steam pumps; and the voyages of these vessels may be effected with a rapidity which, under the old method of transporting the products in barrels, was not to be thought of; seeing that the latter require careful storage and also discharging which is attended with great loss of time. Moreover, the leakage which was considerable when barrels were used is, under the system of tank transport, reduced to a minimum. A tank steamer with a capacity of 800 tons is loaded at Baku in $4\frac{1}{2}$ hours and can be discharged in the same space of time.

These Tank-steamers, and similarly all the steamers which now navigate the Caspian Sea, the Volga and its affluents do not use any other material as fuel than naphtha residue or „masoot“ as it is commonly called in Russia.

This *liquid fuel* apart from its cheapness represents another great advantage in that its heating power is about double that of coal, and in addition to this it can be taken on board by means of pumping as rapidly as the cargo itself. Further, the minimum of manual labour is required to attend to the boilers as the stoker in order to regulate the spray of „masoot“ has only to use a single tap.

At the present time the importance of „masoot“ as a fuel (for which purpose Mr. L. Nobel contrived several apparatuses) has become very considerable, seeing that the annual consumption latterly of „masoot“ has attained over 110,000,000 poods. Its employment for fuelling railway locomotives and steam engines is extending more and more in the Volga district, and is adopted in nearly all the mechanical works; similarly, the industrious undertakings in the Moscow district are now using „masoot“ almost exclusively, — the factory owners having convinced themselves of its superiority. Its cleanliness as a fuel and likewise the high temperature which it may easily be made to yield, renders it specially suitable for metallurgical works, and it may confidently be

predicted that it will play an important part in the future developement of industry, at any rate in the south eastern parts of Russia. The first experiments in fusing iron by means of naphtha residue were made at the mechanical works of Ludwig Nobel in St. Petersburg. The success of these experiments (which could not fail to attract the attention of those interested in the subject) was such that the new fuel found its way even into Sweden where it was adopted by a mechanical work in the fusion of iron.

To refer once more to the organization of the enterprise of the Nobel Brothers there may be stated the following in supplement to what has been said above.

In drawing up the original plan of the undertaking it was decided that the Town of *Tsaritzyn* should serve as the centre of the operations of the Company; at least as regarded the Russian markets, and up to the present time, it has retained that character. To meet the requirements for the sale of the products along the Volga and for the transport to other markets of Benzine and lubricating oils, the Company built in Tsaritzyn a *mechanical coopery*, although the transport was effected mainly by rail in cistern-cars constructed by the Company at its own cost. Subsequently the necessity arose of establishing along the Volga other stores of oil at Saratoff, Batraki, Nijni-Novgorod and at Perm (on the Kama) all of which stores, with the exception of the latter, were intended to facilitate the sale of naphtha residue and lubricating oils, the greater part of which until the opening of the Transcaucasian railway was sent abroad by way of St. Petersburg. From Tsaritzyn the cistern-cars, of which the Company at the present time owns approximately 1633, carried the naphtha and its products to the west, north west and south of Russia, in one word to all the points where railways existed and beyond to the frontiers of Germany and Austro-Hungary.

In order to regulate the organization of these cistern-cars the Company constructed at *Domnino*, near Orel, a central store with a capacity for holding over 4,000,000 poods = 400,000 barrels of petroleum. The distribution throughout Russia of the mineral products is effected from the stores constructed in all the centres of sale of petroleum, and these stores are furnished with reservoirs with a capacity corresponding to the general demand in the given district. Thus, the stores for the local sale of mineral oil in *Petersburg*, *Moscow* and *Warsaw* have each a capacity of from 50,000 to 85,000 barrels of the products, whereas at other points the stores require reservoirs with a capacity of not more than several hundred barrels.

The map of European Russia given in the appendix shows the locality and *capacity of the stores of the company on Russian territory*.

The account of the *property of the Company*, moveable and immoveable, amounts at the present time approximately to Rbs. 26,000,000. The *transport service*, represented by sea and river steamers, lighters and cistern-cars, possess a capacity of about 6,400,000 poods, whilst the *reservoirs* and other *storing plant* belonging to the Company are capable of holding 56,000,000 poods of crude petroleum and the products extracted therefrom.

From the foregoing brief sketch it may be seen that the activity of the Company of the Nobel Brothers, as above remarked, is of a dual character:

1) the *extraction and working of naphtha*, 2) the *transport and sale of mineral products* obtained at the Company's Works in Baku.

The most characteristic feature of the enterprise of the Nobel Brothers consists in the unity, so to say, of its technical organization based on the principal of simplifying the

various parts of the mechanism and arriving at one uniform system.

The exactness with which all these various elements were united into one whole has had the consequence that all the naphtha or crude petroleum obtained by the Company's borings at Baku (Balakhani-Sabuntchi) passes through the whole refining apparatus, becomes converted into illuminating and lubricating oils and benzine and is transported to the most distant points, without leaving the hands of the Company, and that it runs in an incessant stream through pipe lines, stills, agitating, settling and clarifying cisterns, tank-steamers and reservoirs, reaching the lamp of the consumer without having been in a barrel longer than actually necessary to pass through the hands of the retail dealer.

This system has at the present time become so much in vogue in Russia that the transport in barrels, owing to legislative measures and the railway tariffs, is only adopted for lubricating oils and benzine, and the transport of illuminating oils in barrels would now be counted as an anachronism.

Following the example set by the Nobel Brothers in Russia, this system has been adopted not only by Russian mineral oil producers but also in the Western European States, particularly in Germany and Austro-Hungary, whither Russian petroleum is conveyed in cistern cars and is there stored in iron reservoirs of a construction similar to that generally used in Russia and recognised as admirably suitable to the purpose. Simultaneously, Russian petroleum is transported in tank-steamers to Western European ports by way of the Black Sea and the Baltic Sea.

With regard to the *lubricating oil* extracted at Baku from Russian naphtha it may be stated that this product has also in course of time earned a good reputation. Its consumption increases daily seeing that its viscosity taken in connection

with the absence of organic acids admits of its being used for many purposes in preference to other lubricating oils.

In recognition of the superior quality of the products of the Company and taking into consideration its beneficial activity in the matter of the naphtha industry, *the Company has been awarded:*

1) At the „All Russian Exhibition of Industry & Arts“, held in 1882, the highest distinction possible for industrial enterprises: i. e. the right of displaying the „State Eagle“ in the Trade mark of the Company.

2) The following awards were received abroad:

a) In 1884, at the „International Health Exhibition“ in London — a gold medal;

b) In 1885, at the „International Exhibition in Antwerp“ — honorary diploma and gold medal;

c) In 1889, at the „International Exhibition in Paris“ — 2 large prizes (Grand Prix).

In conclusion we will permit ourselves to say a few words respecting the manner in which *Ludwig Nobel* understood his mission in the field of naphtha industry, and how he strived to impart to his enterprise an ideal character. All the plans for the new constructions of tank-steamers, cistern cars, the erection of work shops at the stores, the building of docks etc. were discussed and carried into effect under his direct personal direction. His patience was never exhausted in obtaining even in administrative circles the recognition of the practicability of the innovations introduced by him. This was an extremely difficult task, seeing that all his projects, owing to their radical character and entire novelty, encountered numerous obstacles on the part of the administration; and it was only owing to the iron will and steadfast persistency of

Ludwig Nobel that all his projects attained their end i. e. were realised and practically applied.

It is impossible to pass over in silence an admirable humane feature in the character of Ludwig Nobel. Although fully appreciating the importance of capital in the matter of progress he, at the same time, recognised that the proprietor of an enterprize ought not alone to benefit by the profits derived therefrom, and that a portion of the gains should be distributed among his subordinates and fellow labourers, for the simple reason that on their energy, care and conscientiousness, depended the success of the whole enterprize. Having succeeded in this manner in interesting his employés in the proper and profitable conduct of the business established by him, he strove to render their life, especially at Baku, as favourable as possible. To this end a whole series of dwelling houses were constructed for the employés; in a desert place where formerly there was not to be seen a shady tree or bush, a garden was laid out and other conveniences arranged at a large outlay and much trouble so that the employés and workmen might, in their hours of leisure, recreate themselves. At the chief centres of the Company's activity schools & hospitals were opened for the use of the employed and their families, stipends and savings banks were instituted with a capital at present of several hundred thousand roubles. The individual about whom we are speaking was indeed a man of large deeds in various respects. If, at the present time, a pood of kerosine in Baku costs only from 7—10 cop. a pood, if the traditional Russian chip, the cause of many devastating fires, has now been replaced in the villages by the kerosine lamp, if the poor classes have now access to a cheap lighting material and if, lastly, Russian petroleum has found a large and ready market in Europe, all this is undoubtedly due to the energy and enterprise of Ludwig Nobel. At the same

time all that he did and created was attained without any concessions, guarantees or monopolies, as it was not in the man's nature to solicit from the Government any special privileges for his inventions and innovations. All his labour and all his endeavours were always devoted to and had for their aim the general welfare of the public.

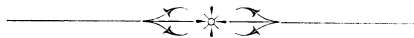


Chart
showing the development of the petroleum industry
in America and in Baku

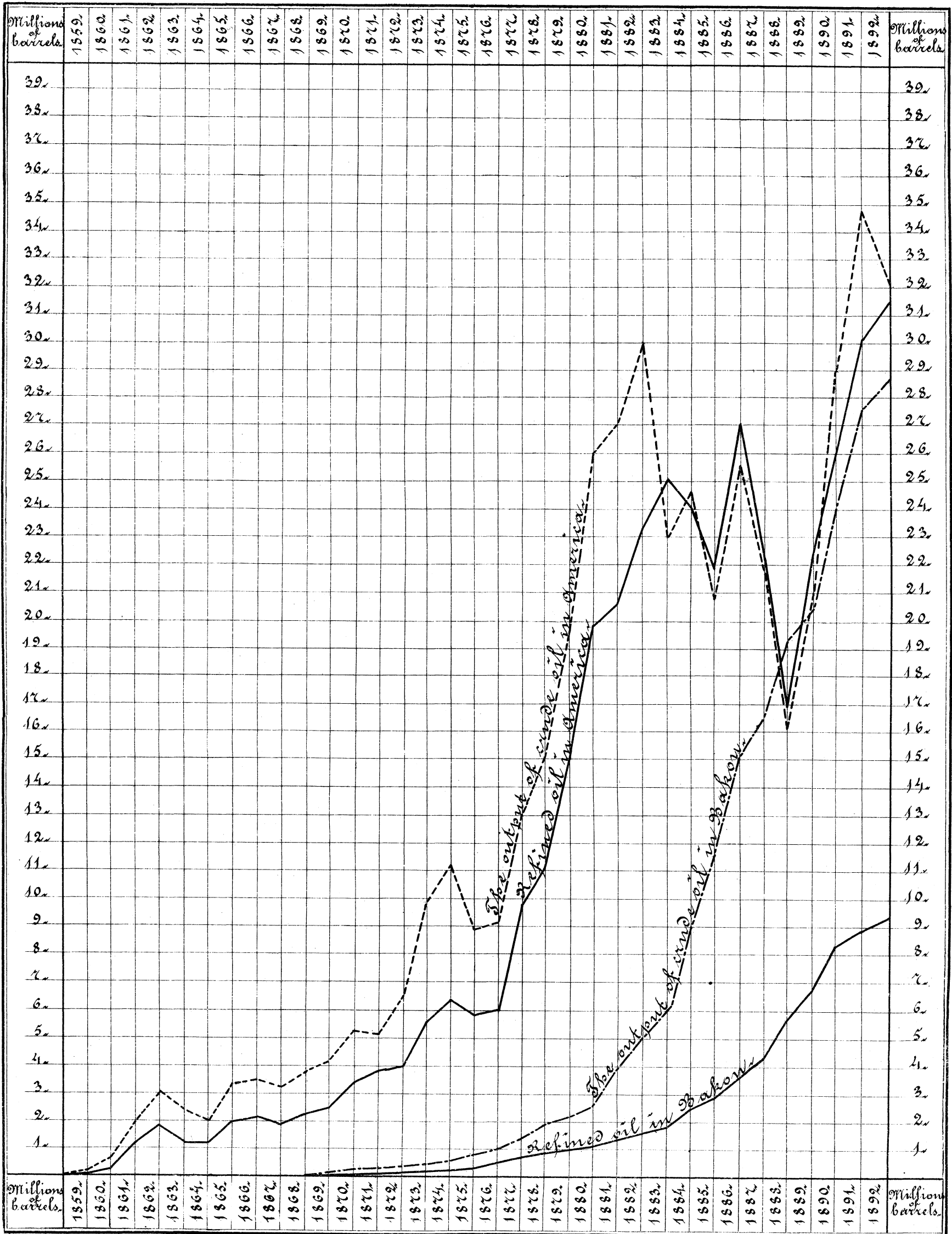
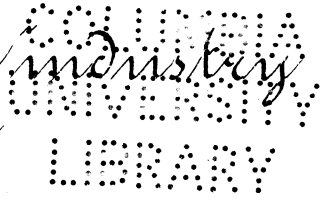


Chart
showing the annual increase of production
of lighting oil - Baku.

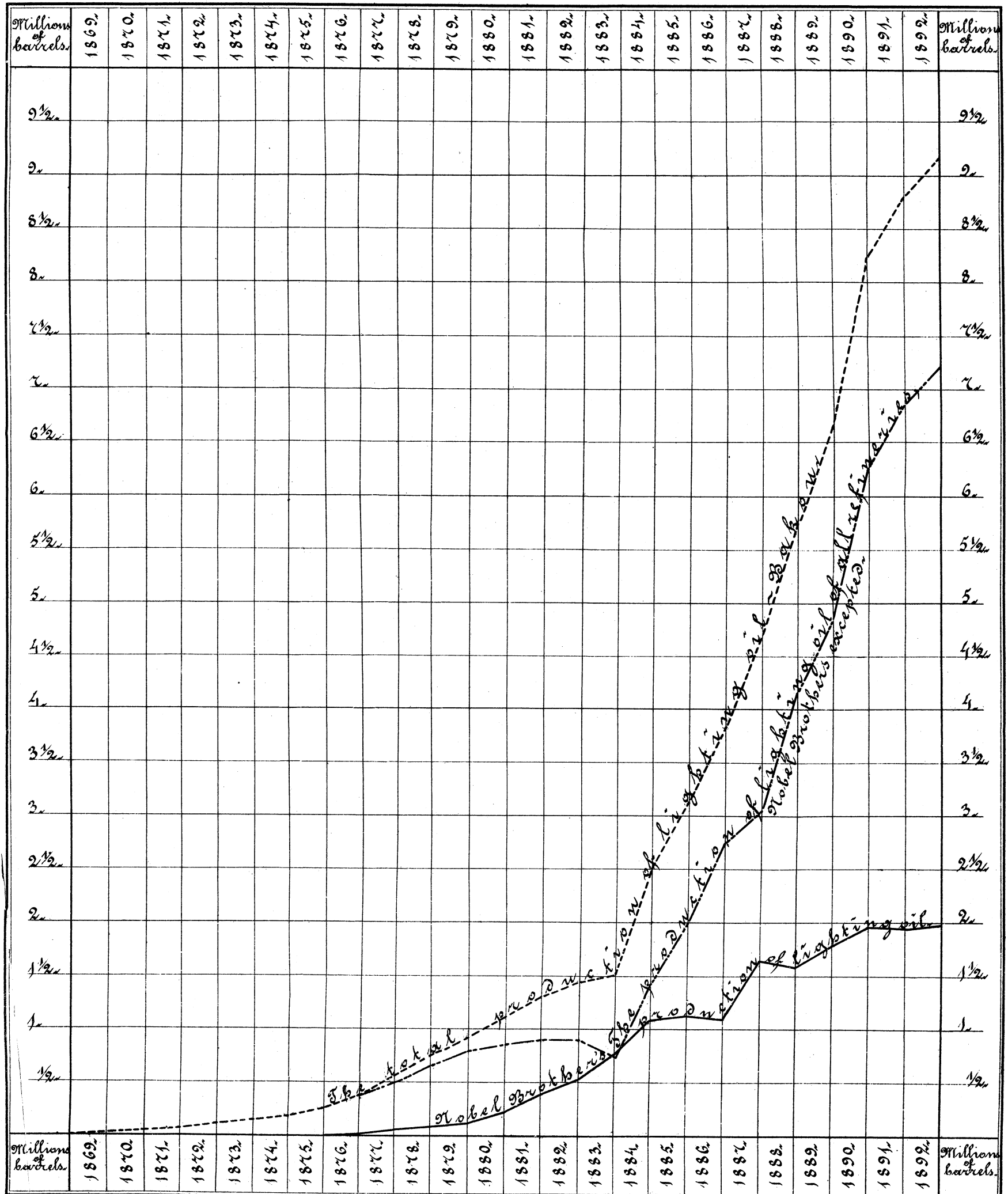
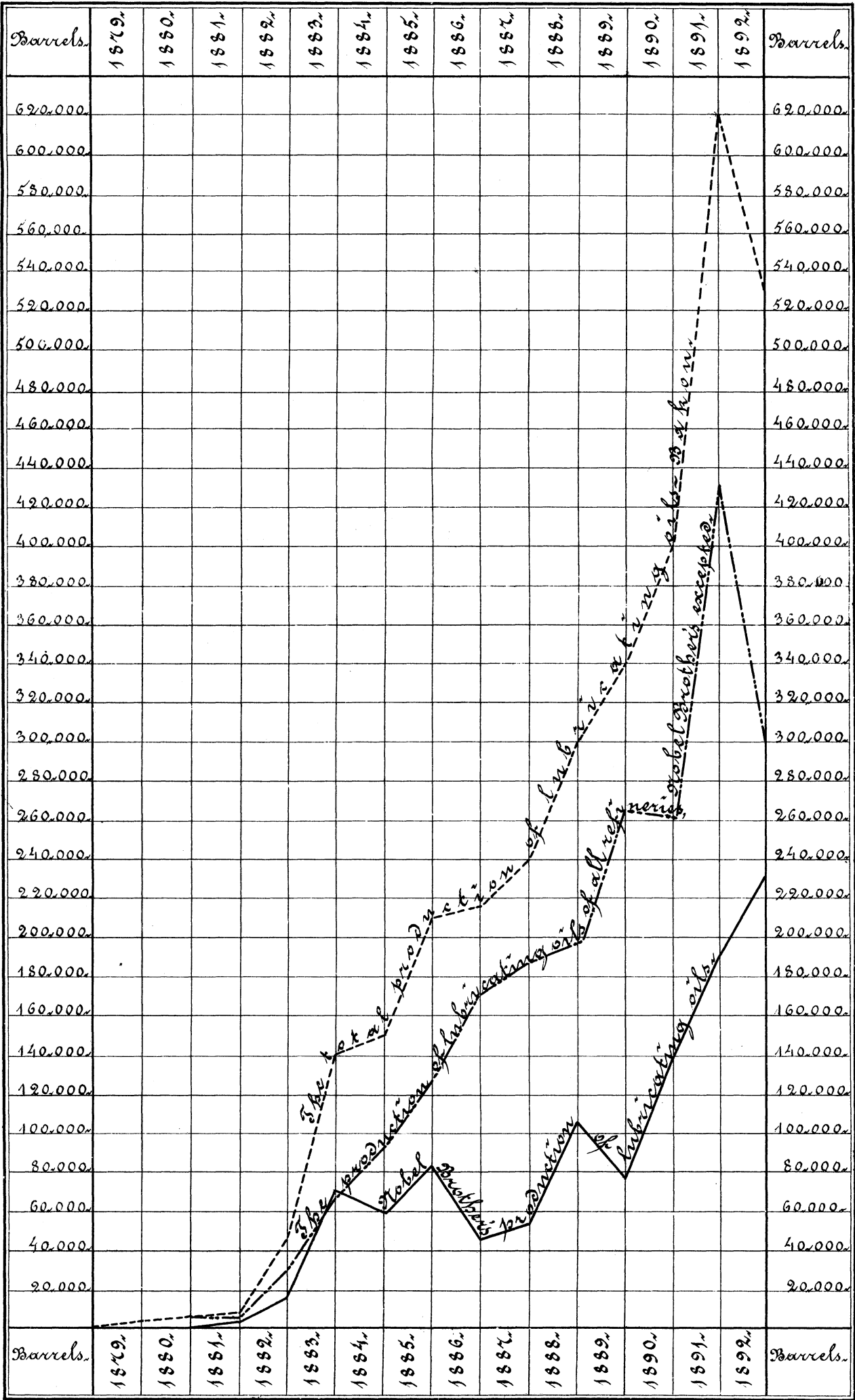
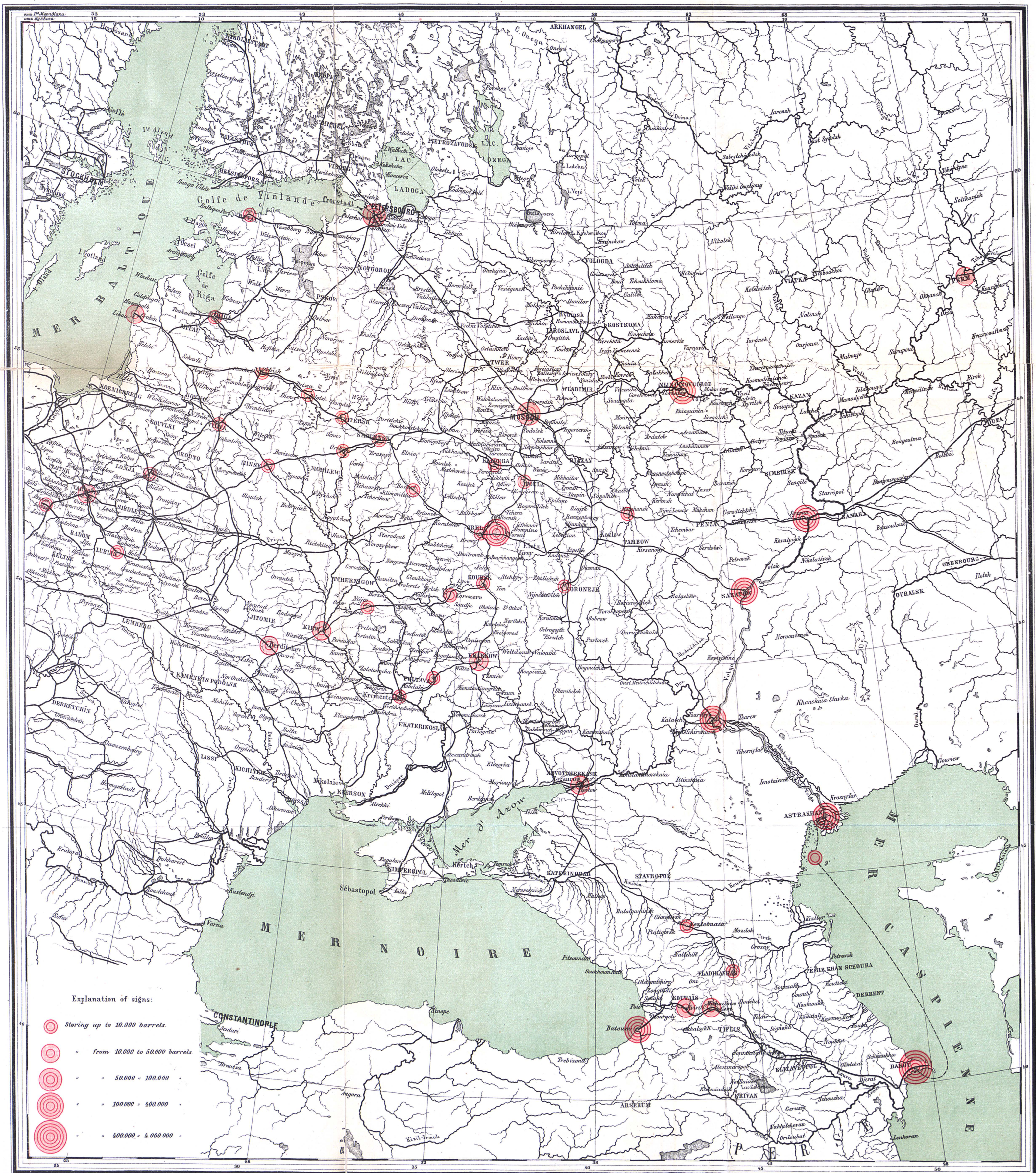


Chart
showing the annual increase of production
of lubricating oils - Baku.



MAP
SHOWING THE PETROLEUM STATIONS AND PLANTS
belonging to
NOBEL BROTHERS PETROLEUM PRODUCTION COMPANY
IN EUROPEAN RUSSIA.
1893.





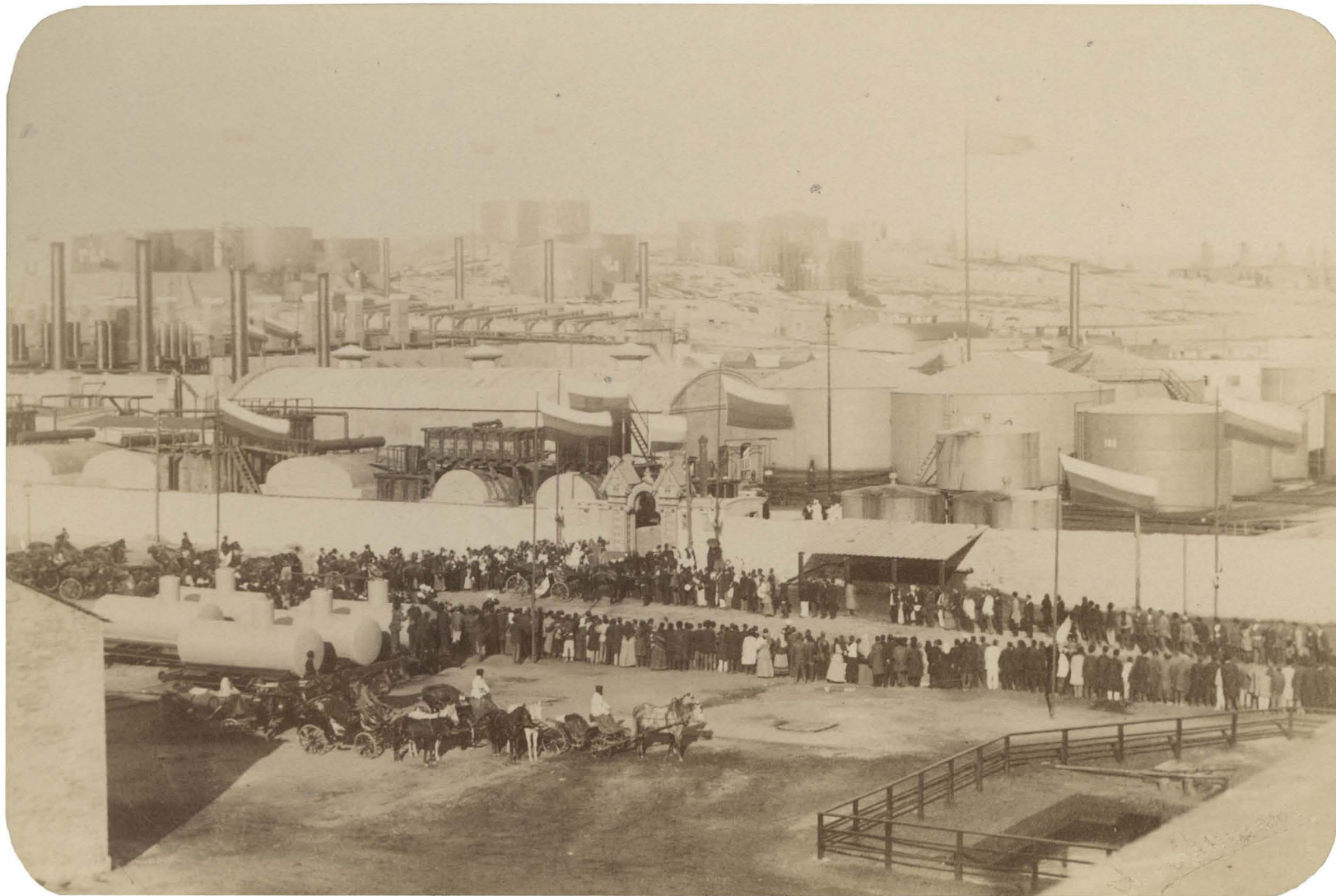
THE CENTRAL PETROLEUM STATION, DOMNINO (OREL).



A MAP OF THE PENINSULA OF APSHERON.



A REGULATED NAPHTHA FOUNTAIN.

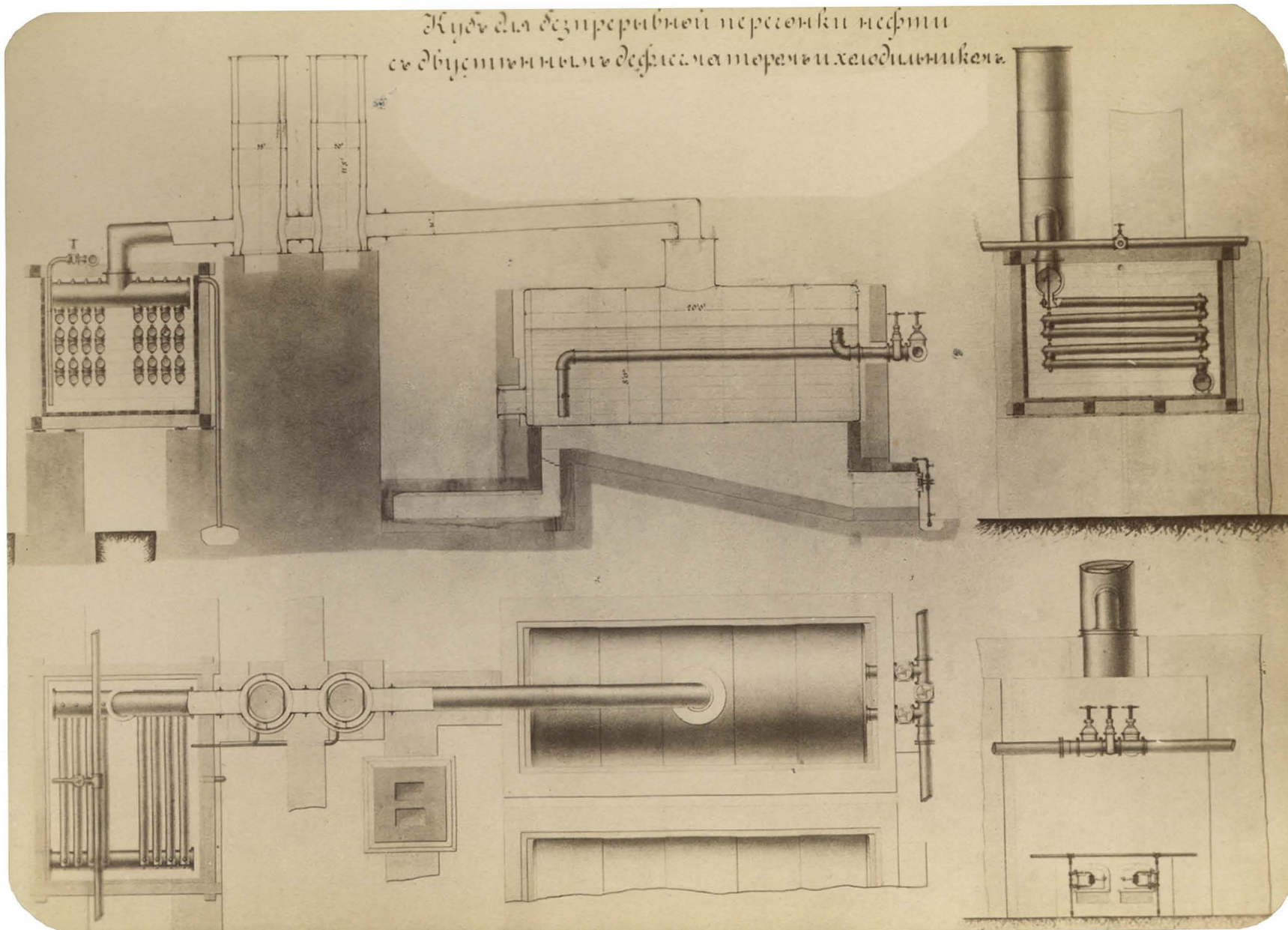


II. H. M. M. THE EMPEROR AND THE EMPRESS OF RUSSIA VISITING THE NOBEL'S REFINERY, BAKOU.

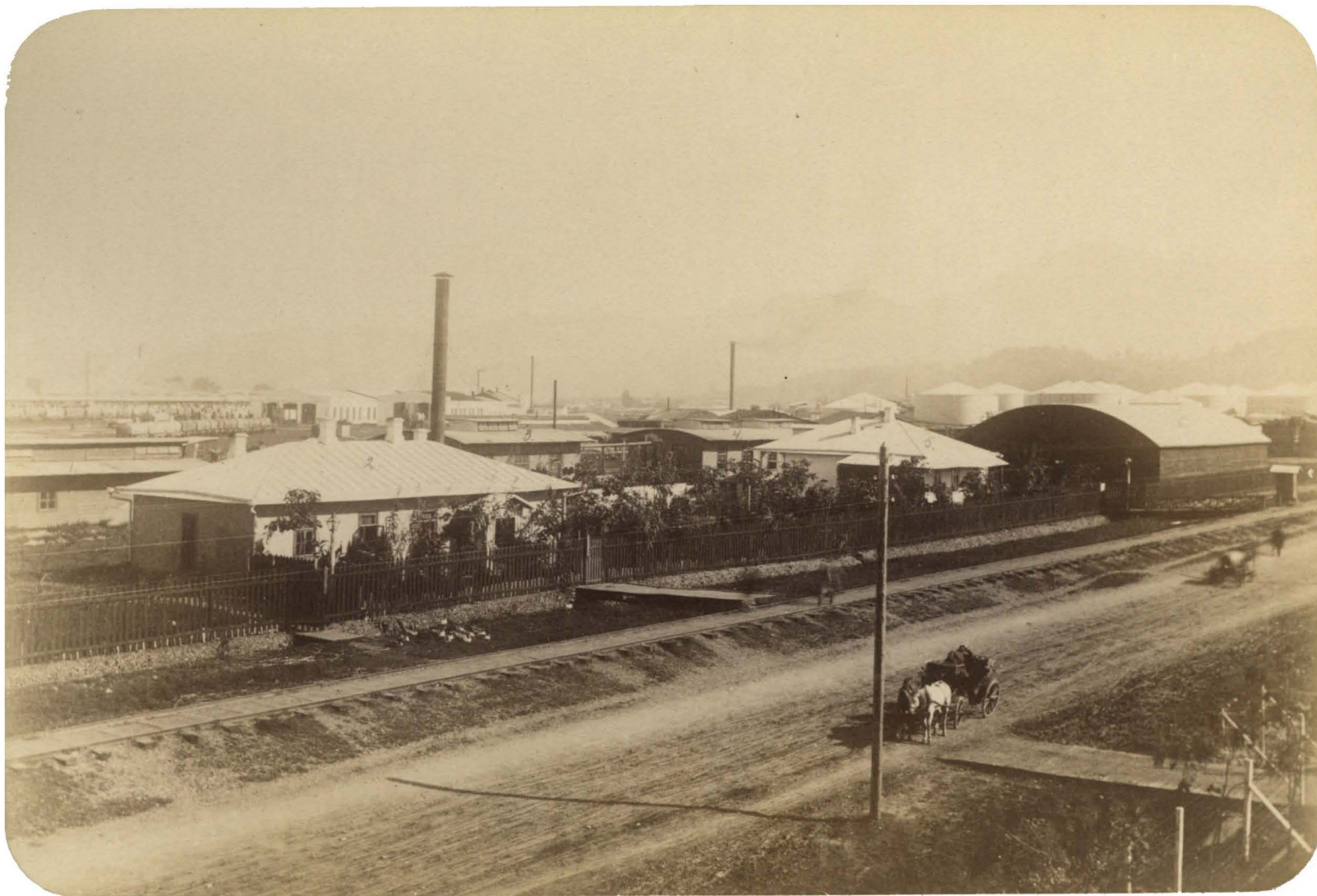


BULK STEAMERS.

Жуль для безпрерывной перегонки нефти
съ двумя нѣтъ дефиса на торцахъ и холодильника.



STILL FOR CONTINUOUS DISTILLATION INCLUDING DEPHLEGMATORS AND CONDENSER.



THE PETROLEUM STORAGE STATION, BATOUM HARBOUR.



DOCK AND TUG STEAMERS, ASTRAKHAN.



LUBRICATING OIL PURIFYING PLANT, BAKOU.



WOODEN BULK BARGES FOR TRANSPORTATION OF MASOOT ON THE RIVER VOLGA.



VIEW OF THE PETROLEUM FIELD, BALAKHANY.



CENTRAL PUMPING STATION, BALAKHANY.



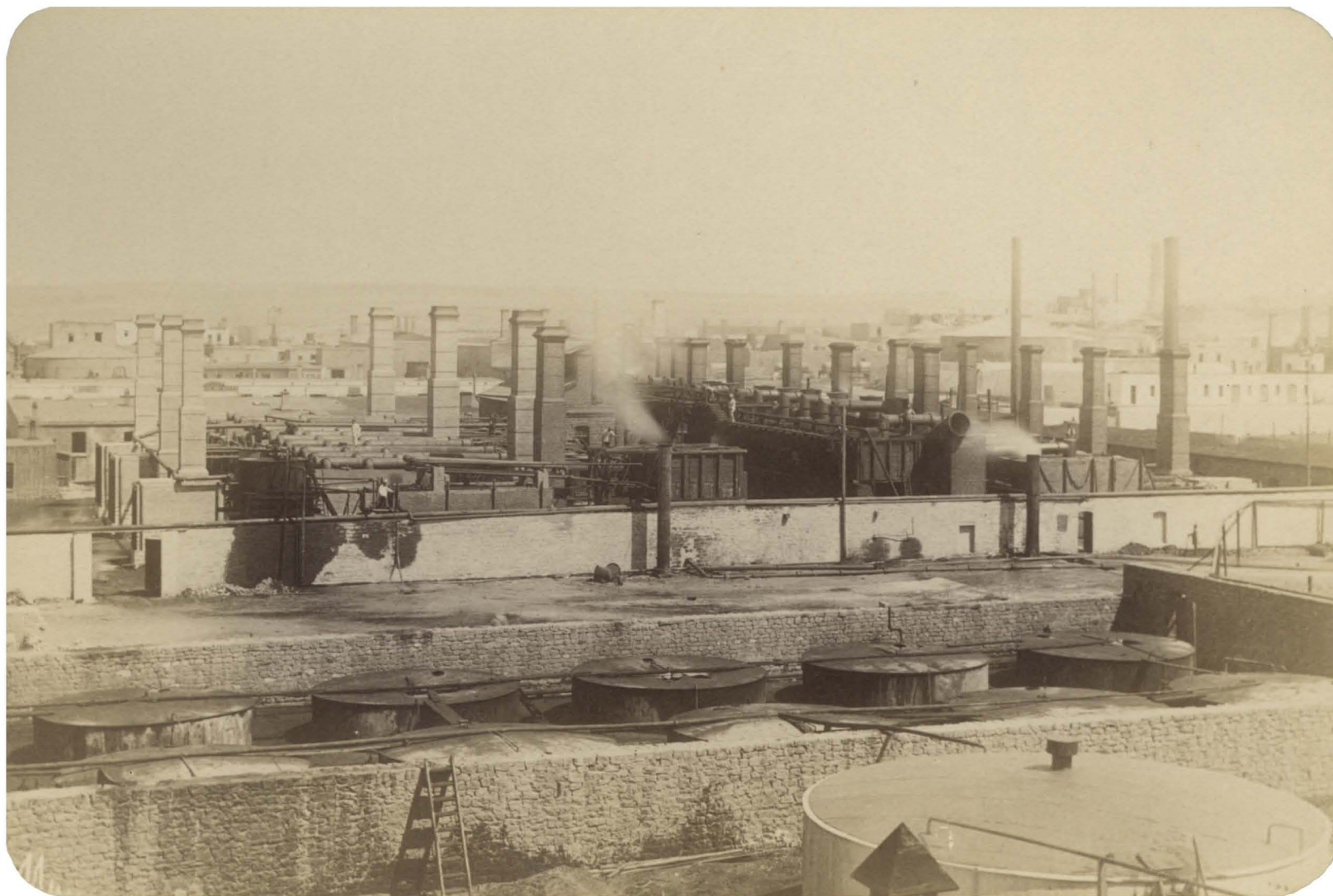
LIGHTING OIL PURIFYING PLANT, BAKOU.



PETROLEUM STATION, BATOUM HARBOUR.



LIGHTING OIL DISTILLERY, BAKOU.



LUBRICATING OIL DISTILLERY, BAKOU.



THE PETROLEUM STORAGE STATION, TSARITSYN ON THE VOLGA.



THE PETROLEUM STORAGE STATION, BATOUM HARBOUR.



THE SHORE OF THE RIVER VOLGA NEAR ASTRAKHAN AND DIFFERENT BULK BARGES FOR TRANSPORTATION OF PETROLEUM PRODUCTS.



VIEW OF THE PETROLEUM FIELD, BALAKHANY.



NAPHTHA FOUNTAIN.

